Piezoelectric Ceramic Sensors (PIEZOTITE®)

Ultrasonic Sensors

Open Structure Type

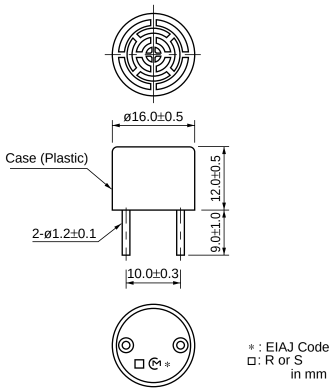
■ Features

1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.

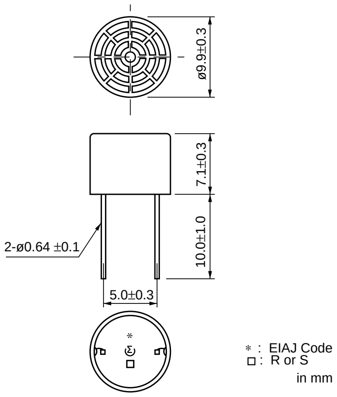
■ Applications

Burglar alarms, Range finders, Automatic doors, Remote control.

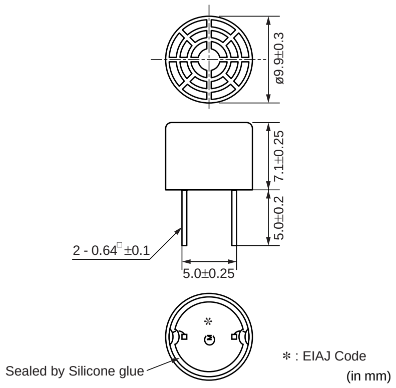
MA40B8R/S



MA40S4R/S



MA40S5



Part Number	Construction	Using Method	Nominal Freq. (kHz)	Overall Sensitivity (mVp-p)	Sensitivity (dB)	S.P.L. (dB)	Directivity (°)	Cap. (pF)	Operating Temp. Range (°C)	Detectable Range (m)	Resolution (mm)	Max. Input Voltage (Vp-p)
MA40B8R	Open struct.	Receiver	40	-	-63 typ. (0dB=10V/Pa)	-	50	2000	-30 to 85	0.2 to 6	9	-
MA40B8S	Open struct.	Transmitter	40	-	-	120 typ. (0dB=0.02mPa)	50	2000	-30 to 85	0.2 to 6	9	40 Continuous signal
MA40S4R	Open struct.	Receiver	40	-	-63 typ. (0dB=10V/Pa)	-	80	2550	-40 to 85	0.2 to 4	9	-
MA40S4S	Open struct.	Transmitter	40	-	-	120 typ. (0dB=0.02mPa)	80	2550	-40 to 85	0.2 to 4	9	20 Continuous signal
MA40S5	Open struct.	Dual Use	40	20 typ.	-	-	60 typ.	2550	-30 to 85	0.5 to 2	9	20 Pulse width 0.4ms Interval 100ms

Distance:30cm, Overall sensitivity:0dB=10Vp-p, Sensitivity:0dB=1Vrms/μbar, Sound pressure level:0dB=2x10^{-4}μbar, 1μbar=0.1Pa

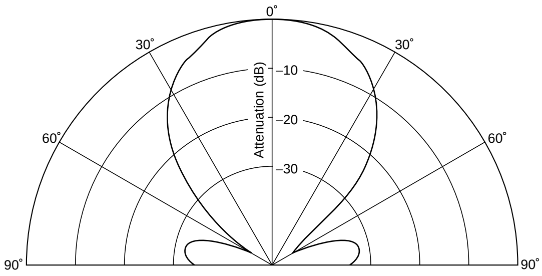
The sensor can be used in the operating temperature range.

Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.

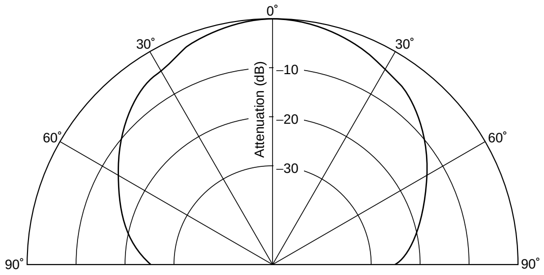
Directivty, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

■ Directivity in Sensitivity

MA40B8R

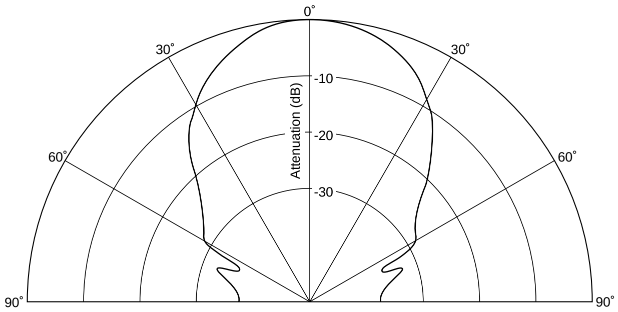


MA40S4R



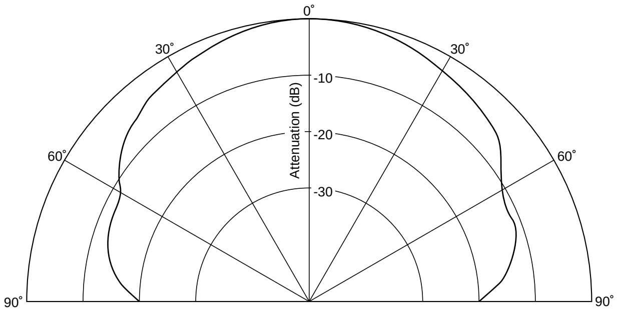
■ Directivity in S. P. L.

MA40B8S



■ Directivity in S. P. L.

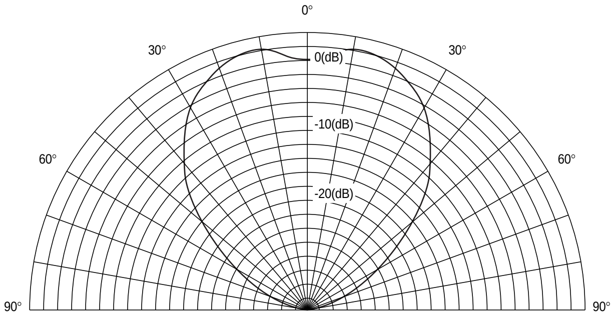
MA40S4S



■ Directivity in Overall Sensitivity

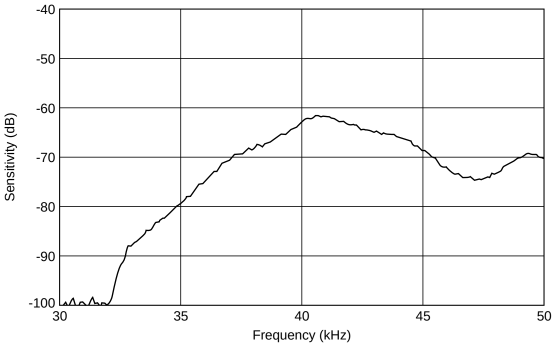
MA40S5

Beam Pattern



■ S. P. L. -Freq. Characteristics

MA40B8R



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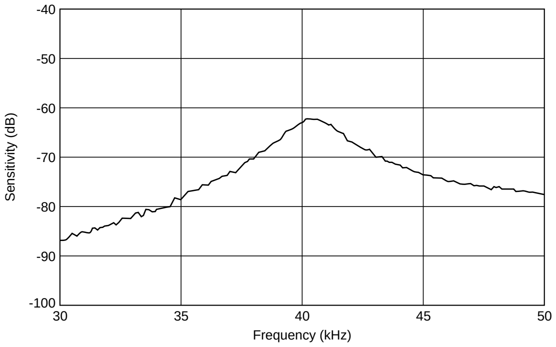
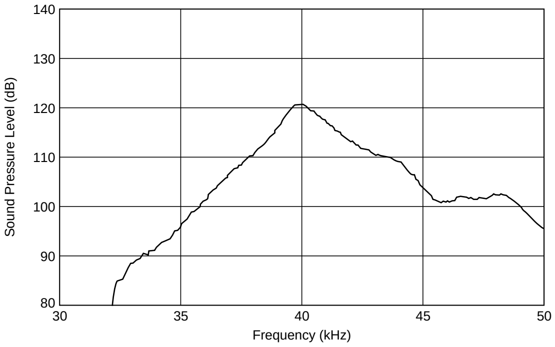
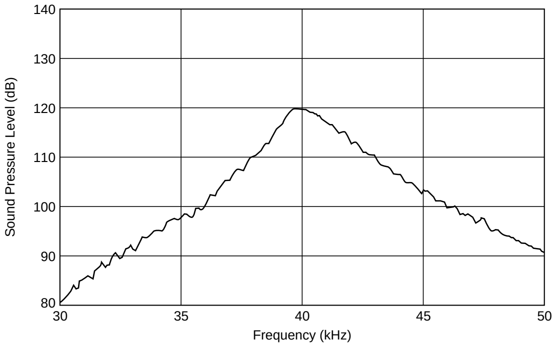


■ Sensitivity-Freq. Characteristics

MA40B8S



MA40S4S



Water Proof Type Symmetric Directivity

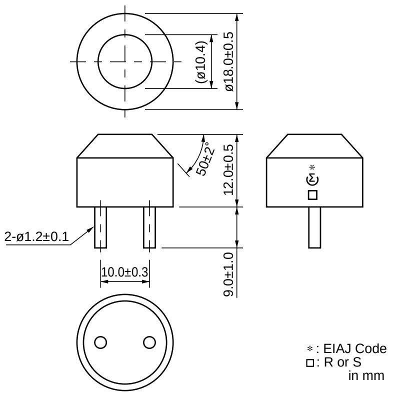
■ Features

1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.

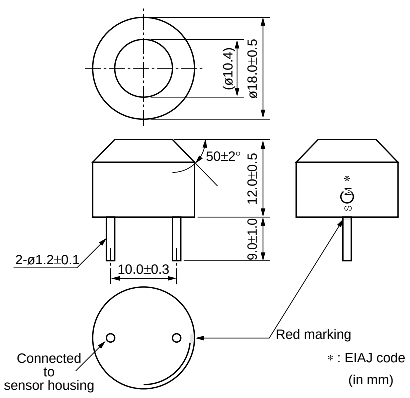
■ Applications

Back sonar of automobiles, Parking meters, Water level meters.

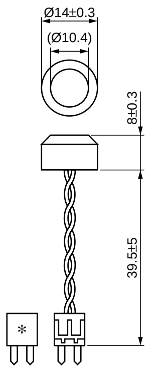
MA40E7R/S



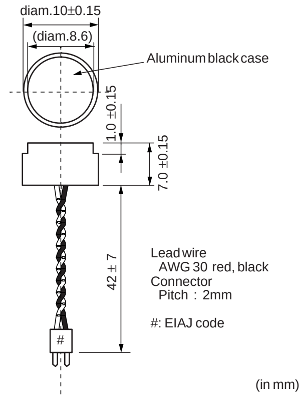
MA40E7S-1



MA40E8-2



MA40MC10-1B

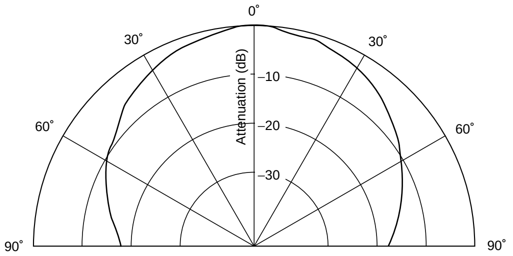


Part Number	Construction	Using Method	Nominal Freq. (kHz)	Overall Sensitivity	Sensitivity (dB)	S.P.L. (dB)	Directivity (°)	Cap. (pF)	Operating Temp. Range (°C)	Detectable Range (m)	Resolution (mm)	Max. Input Voltage (Vp-p)
MA40E7R	Water proof	Receiver	40	-	-74 min. (0dB=10V/Pa)	-	100	2200	-30 to 85	0.2 to 3	9	-
MA40E7S	Water proof	Transmitter	40	-	-	106 min. (0dB=0.02mPa)	100	2200	-30 to 85	0.2 to 3	9	100 Pulse width 0.4ms Interval 100ms
MA40E7S-1	Water proof	Dual Use	40	-	-72 min. (0dB=10V/Pa) : reference only	106 min. (0dB=0.02mPa)	75	2200	-30 to 85	0.2 to 3	9	100 Pulse width 0.4ms Interval 100ms
MA40E8-2	Water proof	Dual Use	40	-	-85 min. (0dB=10V/Pa)	106 min. (0dB=0.02mPa)	75	2800	-30 to 85	0.2 to 1.5	9	160 Pulse width 0.8ms Interval 60ms
MA40MC10-1B	Water proof	Dual Use	40	-	-86 min. (0dB=10V/Pa)	104 min. (0dB=0.02mPa)	100 typ.	2400	-30 to 85	0.2 to 1.5	9	160 Pulse width 0.8ms Interval 60ms

Distance:30cm, Overall sensitivity:0dB=10Vp-p, Sensitivity:0dB=1Vrms/μbar, Sound pressure level:0dB=2x10^{-4}μbar, 1μbar=0.1Pa
The sensor can be used in the operating temperature range.
Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.
Directivty, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

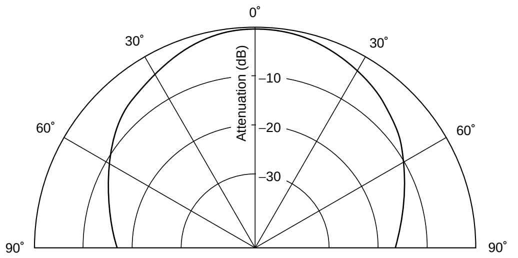
■ Directivity in Sensitivity

MA40E7R



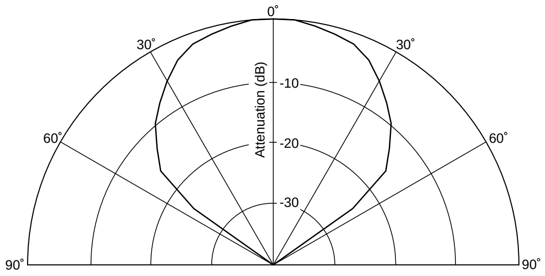
■ Directivity in S. P. L.

MA40E7S

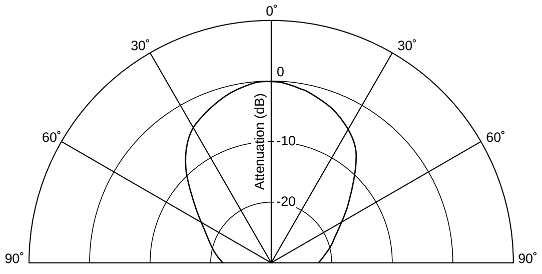


■ Directivity in Overall Sensitivity

MA40E7S-1

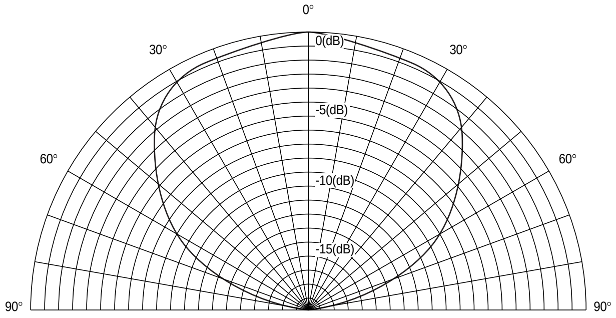


MA40E8-2



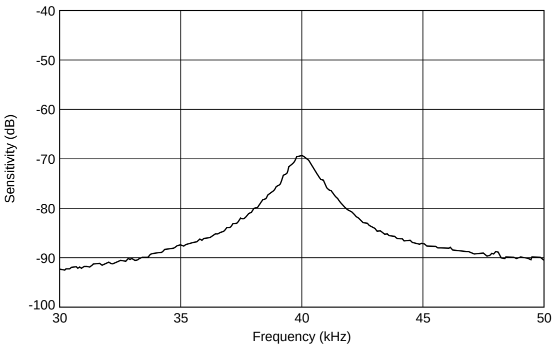
MA40MC10-1B

Beam Pattern



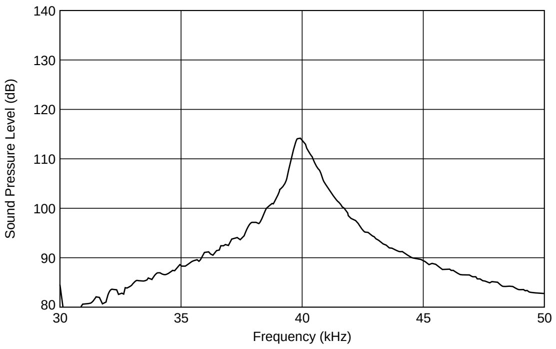
■ S. P. L. -Freq. Characteristics

MA40E7R



■ Sensitivity-Freq. Characteristics

MA40E7S



Water Proof Type Asymmetric Directivity

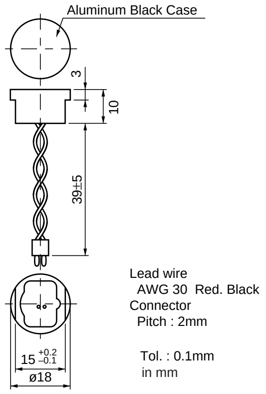
■ Features

1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.
5. Compressed directivity by itself

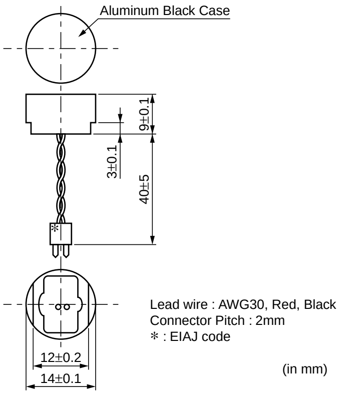
■ Applications

Vack sonar of automobiles, Parking meters, Water level meter.

MA40E9-1



MA40MF14-1B

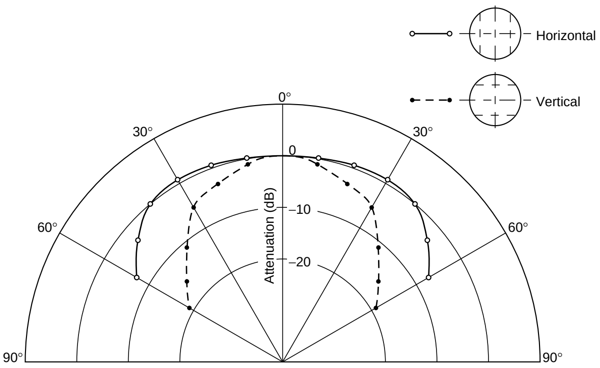


Part Number	Construction	Using Method	Nominal Freq. (kHz)	Overall Sensitivity	Sensitivity (dB)	S.P.L. (dB)	Directivity (°)	Cap. (pF)	Operating Temp. Range (°C)	Detectable Range (m)	Resolution (mm)	Max. Input Voltage (Vp-p)
MA40E9-1	Water proof	Dual Use	40	-	-85 min. (0dB=10V/Pa)	103 min. (0dB=0.02mPa)	100 x50°	4000	-30 to 85	0.2 to 1.5	9	160 Pulse width 0.8ms Interval 60ms
MA40MF14-1B	Water proof	Dual Use	40	-	-87 min. (0dB=10V/Pa)	103 min. (0dB=0.02mPa)	110 x50°	4400	-30 to 85	0.2 to 1.5	9	160 Pulse width 0.8ms Interval 60ms

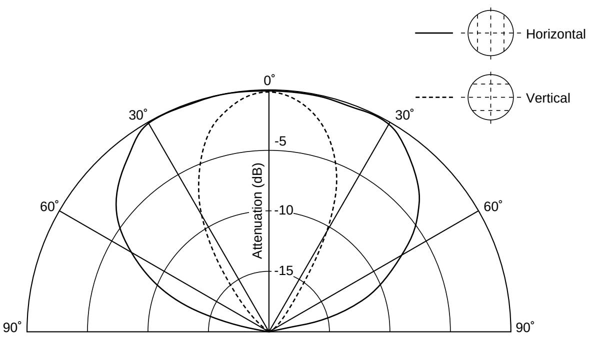
The sensor can be used in the operating temperature range.
Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.
Directivty, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

■ Directivity in Overall Sensitivity

MA40E9-1



MA40MF14-1B



High-frequency Type

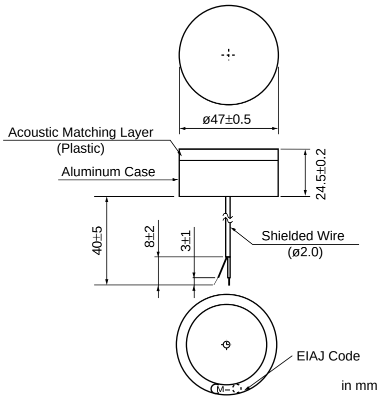
■ Features

Using longitudinal vibration and matching with the air by acoustic matching layer, this type realized high sensitivity. Because of short wavelength, this type has sharp directivity and can be used high precise measurement.

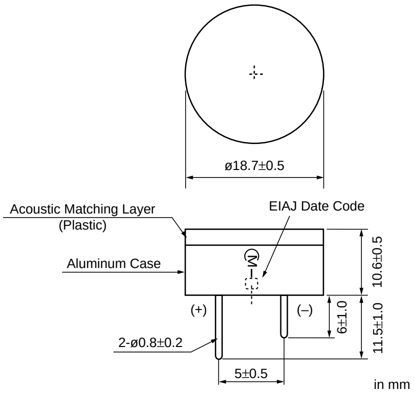
■ Applications

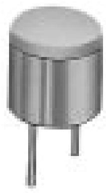
Approach switch for FA, Distance meter, Water or liquid level meters.

MA80A1

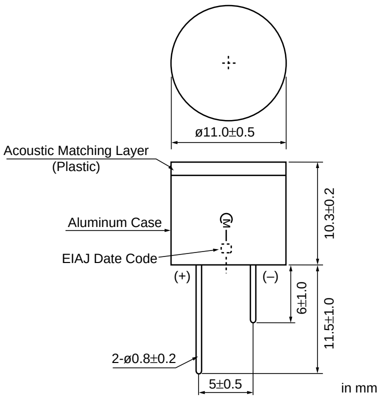


MA200A1





MA400A1

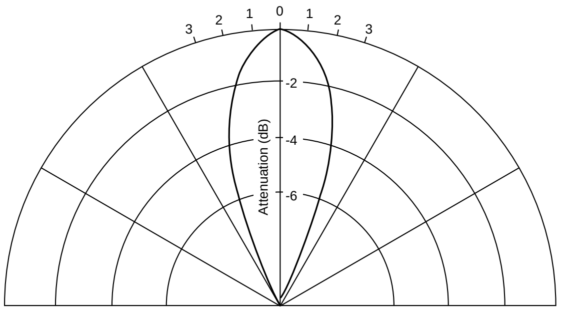


Part Number	Construction	Using Method	Nominal Freq. (kHz)	Overall Sensitivity (dB)	Sensitivity	S.P.L.	Directivity (°)	Cap.	Operating Temp. Range (°C)	Detectable Range (m)	Resolution (mm)	Max. Input Voltage (Vp-p)
MA80A1	High frequency type	Dual Use	75 +/-5	-47 min. 0dB=18Vpp (at 50cm)	-	-	7	-	-10 to 60	0.5 to 5	4	120 Pulse width 0.6ms Interval 50ms
MA200A1	High frequency type	Dual Use	200 +/-10	-54 min. 0dB=18Vpp (at 20cm)	-	-	7	-	-30 to 60	0.2 to 1	2	120 Pulse width 250µs Interval 20ms
MA400A1	High frequency type	Dual Use	400 +/-20	-74 min. 0dB=18Vpp (at 10cm)	-	-	7	-	-30 to 60	0.06 to 0.3	1	120 Pulse width 125µs Interval 10ms

The sensor can be used in the operating temperature range.
Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.
Directivty, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

■ Directivity in Overall Sensitivity

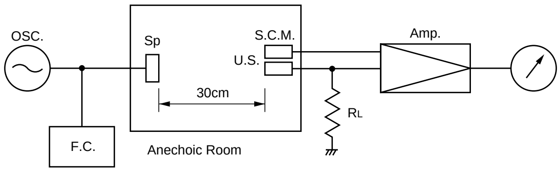
MA_A1 Series



Data/Notice/Part Numbering

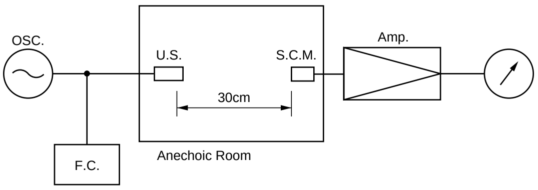
■ Test Circuit

Receiver



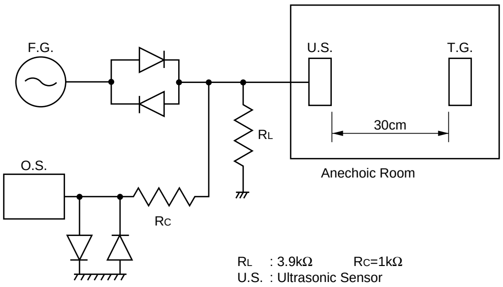
R_L : 3.9kΩ
U.S. : Ultrasonic Sensor
S.C.M. : Standard Capacitor Microphone (Brüel&Kjær 4135)
Amp. : Amplifier (Brüel&Kjær 2610)
OSC. : Oscillator
Sp. : Tweeter
F.C. : Frequency Counter

Transmitter



U.S. : Ultrasonic Sensor (Brüel&Kjær 4135)
S.C.M. : Standard Capacitor Microphone (Brüel&Kjær 2610)
Amp. : Amplifier
Input Voltage : 10 Vrms
F.C. : Frequency Counter

Dual Use



R_L : 3.9kΩ R_C=1kΩ
U.S. : Ultrasonic Sensor
T.G. : Target
F.G. : Function Generator
O.S. : Oscilloscope

■ Notice (Soldering and Mounting)

1. Pay attention to the mounting position as these sensors have directivity.
2. Please avoid applying DC-bias by connecting DC blocking capacitor or some other way because, otherwise, the component may be damaged.
3. Do not use in water.

● Part Numbering

(The structure of the "Global Part Numbers" that have been adopted since June 2001 and the meaning of each code are described herein.
If you have any questions about details, inquire at your usual Murata sales office or distributor.)

Ultrasonic Sensors

(Global Part Number)	**MA**	**40MF**	**14**	**-1N**	**-M**
	❶	❷	❸	❹	❺

❶Product ID
❷Series
❸Characteristics
❹Individual Specification Code
❺Packaging

* Global Part Number shows only an example which might be different from actual part number.
* Any other definitions than "❶Product ID" might have different digit numbers from actual Global Part Number.